REPORT DOCUMENTATION PAGE

Form Approved
OMB NO. 0704-0188

1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	13 August 2001	Final Report: ~~April 1, 2000 – August 6, 2001~~ 10 May 00 - 09 Aug 01

4. TITLE AND SUBTITLE

Planning for Alaska DEPSCoR

5. FUNDING NUMBERS

C # DAAD19-00-1-0354

6. AUTHOR(S)

George Happ

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

University of Alaska Fairbanks
Office of Arctic Programs
P.O. Box 7000 311 Irving I
Fairbanks, Alaska 99775-7000

8. PERFORMING ORGANIZATION REPORT NUMBER

Proposal # S00001149

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U. S. Army Research Office
P.O. Box 12211
Research Triangle Park, NC 27709-2211

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

41422.1-RT-DPP

11. SUPPLEMENTARY NOTES

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other documentation.

12 a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited.

12 b. DISTRIBUTION CODE

20011023 040

13. ABSTRACT (Maximum 200 words)

In its planning phase, Alaska EPSCoR aims to develop a statewide, integrated EPSCoR program to build research in science and technology for Alaska and to serve national needs in scientific research, education, and technology transfer. Our process includes careful consideration of the research strengths on the university campuses, the growth potential of various sectors of the state's economy, the needs of the people of Alaska for more education in science and engineering, and the integration of university research priorities. The specific aims of the DEPSCoR planning effort are:

1. To hold workshops on DEPSCoR opportunities for Alaskan scientists and engineers.
2. To fund travel for Alaska scientists and engineers to visit DOD program officers.
3. To fund travel for Alaska scientists and engineers to develop collaborations in DOD priority areas for research.

In the project period, Alaska EPSCoR has accomplished the following:

1. Provided administrative planning and leadership to support faculty in the development and submission of DOD research proposals.
2. Provided coordination and logistical support for three workshops related to EPSCoR Research Focus Areas and DOD funding priorities.
3. Provided travel support to seven scientists to attend workshops, develop collaborative proposals, or meet with program officers.
4. Supported faculty in the submission of four FY 2001 DEPSCoR proposals, three of which were funded in February 2001.
5. Provided DEPSCoR website publicity for FY 2001 and FY 2002 solicitations, including guidance on proposal development and submission.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Administrative planning; workshops on DOD research opportunities; faculty travel support; collaborative proposals; website publicity, funded proposals.	14
	16. PRICE CODE

MASTER COPY: PLEASE KEEP THIS "MEMORANDUM OF TRANSMITTAL" BLANK FOR REPRODUCTION PURPOSES. WHEN REPORTS ARE GENERATED UNDER THE ARO SPONSORSHIP, FORWARD A COMPLETED COPY OF THIS FORM WITH EACH REPORT SHIPMENT TO THE ARO. THIS WILL ASSURE PROPER IDENTIFICATION. NOT TO BE USED FOR INTERIM PROGRESS REPORTS; SEE PAGE 2 FOR INTERIM PROGRESS REPORT INSTRUCTIONS.

MEMORANDUM OF TRANSMITTAL

U.S. Army Research Office
ATTN: AMSRL-RO-RI (Hall)
P.O. Box 12211
Research Triangle Park, NC 27709-2211

☐ Reprint (Orig + 2 copies)
☐ Technical Report (Orig + 2 copies)
☐ Manuscript (1 copy)
☑ Final Progress Report (Orig + 2 copies)
☐ Related Materials, Abstracts, Theses (1 copy)

CONTRACT/GRANT NUMBER: C# DAAD 19-00-1-0354

REPORT TITLE: Planning For Alaska DEPSCoR

is forwarded for your information.

SUBMITTED FOR PUBLICATION TO (applicable only if report is manuscript):

Sincerely,

Dr. George M. Happ 41422-RT-DPP
University of Alaska Fairbanks
Office of Artic Programs
PO Box 7000, 311 Irving 1
Fairbanks, AK 99775-7000

closure 3

FINAL PROGRESS REPORT:

PLANNING FOR ALASKA DEPSCoR

Alaska EPSCoR
University of Alaska Fairbanks

C#DAAD19-00-1-0354

STATEMENT OF PROBLEM.

The University of Alaska EPSCoR program is challenged with improving the quality and competitiveness of basic science and engineering research and education programs in colleges and universities in Alaska. In its planning phase, Alaska EPSCoR must develop a statewide, integrated approach to serve national research needs while giving careful consideration to the existing and potential strengths on the university campuses, the growth potential of various sectors of the state's economy, and the needs of the people of Alaska for more education in science and engineering.

The DEPSCoR program is an important source of federal support for basic science and engineering research and education programs in Alaska. In the project "Planning for Alaska DEPSCoR" we aimed to improve the competitiveness of UA researchers by initiating the following activities:

- Conduct workshops on DEPSCoR research priorities and funding opportunities for Alaska scientists and engineers and explore common research priorities at the state and national level.

- Support opportunities for collaboration between UA researchers, the state, and the private sector, including travel support for public and private sector participants to meet and identify common research interests and expertise.

- Provide comprehensive and timely information to UA scientists on DEPSCoR funding opportunities, application procedures, proposal preparation and submission, and other information and administrative guidance as needed to increase the submission and success of UA DEPSCoR proposals.

SUMMARY OF SIGNIFICANT ACCOMPLISHMENTS.

1. Workshops and collaborative meetings.

Planning grant funds were requested to conduct workshops with Alaska scientists and industry representatives to identify and prioritize research strengths on the UA campuses and identify research projects that serve the needs of our state and nation. The following workshops were supported, in-part, by the planning grant:

Cold Regions Engineering Research Needs Workshop, University of Alaska Fairbanks, December 7, 2001. Infrastructure and Systems for Cold Regions Research Focus Area

Participants: UA Fairbanks and UA Anchorage Engineering faculty, Alaska Dept. of Transportation and Public Facilities, Alaska Science and Technology Center, Nortech Environmental & Engineering Consultants, R&M Engineering Consultants, BP Exploration, PN&D Engineers, Dept. of Health and

Environmental Engineering—Alaska Native Tribal Health Consortium, Design Alaska, U.S. Arctic Research Commission, and USA CRREL, Ft. Wainwright.

Workshop topics: Use of marginal materials in road construction; permafrost thaw and foundation stability; wetland treatment of domestic wastewater, industrial effluents, and mine drainage; cold region contaminate fate and transport; improved methods for geotechnical investigations; north slope oilfield facilities and problems related to heat and permafrost thaw, wind loads, flooding, frost heaving, and ocean ice loading; reducing energy costs of water and sewer facilities in rural Alaska; cold climate corrosion research, including atmospheric corrosion rates, effective CO2 inhibitors, and costs of corrosion control in the arctic.

Cold Regions Port and Coastal Infrastructure Workshop, University of Alaska Anchorage, January 4-5, 2001. Research needs and priorities to address Alaskan maritime challenges in the face of climate warming.
Organized by: UAA School of Engineering, US Army Cold Regions Research Lab and Racal Palagos.

Workshop topics: Cold Regions port design and construction, charting and mapping, intermodal arctic shipping opportunities, coastal shore protection, port authorities in Alaska, and data and technology transfer.

Materials Research and Manufacturing Workshop, University of Alaska Fairbanks, February 9, 2001. Gaps in UAF materials research infrastructure: recommendations and suggested research programs.

Workshop topics: Argonne National Laboratory research activities in materials science, energy, and tribology; biomaterials and tissue engineering; arctic polymeric materials; rapid prototyping and manufacturing with solid freeform fabrication; research needs in the automotive industry; current research needs in the semiconductor industry, and Alaska energy research needs.

Contractual funds expended in period for workshop support: **$ 982**

2. Travel support for attendance at workshops and collaborative meetings: Planning funds were expended to support travel costs of 17 faculty and visiting scientists to attend the DEPSCoR related workshops described above, or to consult with DEPSCoR program officers on proposal development.

Travel funds expended in period for participant travel to workshops and consultations: **$8,586**

3. DEPSCoR planning administration, program publicity and proposal submission assistance: Planning funds were expended to provide program publicity and administrative leadership that would lead to the submission of new DEPSCoR proposals.

DEPSCoR web links were established at: http://www.alaska.edu/epscor. Program announcements and submission guidelines were provided for FY 2001 and FY 2002 at this web site. In addition, all deans, directors, proposal coordinators, and science and engineering faculty were contacted regarding DEPSCoR program announcements and application procedures. A brochure on DEPSCoR funding for FY 2002 was also developed and distributed widely to UA faculty.

Dr. George Happ, PI, Planning for Alaska DEPSCoR, accomplished the following:

a. Led discussions with UA science and engineering faculty on guidelines, procedures, and policies for developing and submitting FY 2001 and FY 2002 DEPSCoR proposals.
b. Created procedures for proposal submission and criteria for review of proposals for FY 2001 and FY 2002.
c. Screened FY 2001 UA DEPSCoR proposals.
d. Coordinated all DEPSCoR program publicity, including developing a DEPSCoR web site link that provides:

- A powerpoint presentation on DEPSCoR
- Links to the most current DEPSCoR solicitation announcement.
- Procedures for submission and screening of UA proposals
- Criteria for proposal pre-selection to DOD
- Timelines for final grant submission, review, and award announcement
- Access to FY 2001 awarded proposals to UA researchers
- Information on upcoming DEPSCoR related workshops and conferences
- Workshop and conference proceedings

Funds expended in the period for program administration and publicity: **$13,067** (direct costs)

4. The following DEPSCoR proposals were submitted for FY 2001:

Title: Study of Metabolic and CNS Suppression During Hibernation Using Microdialysis and Capillary Electrophoresis with Laser-Induced Fluorescence Detection (CE-LIFD).
Principal Investigators: Kelly Drew, Asst. Professor of Neurochemistry and Thomas K. Green, Professor of Chemistry, University of Alaska, Fairbanks.
Date of award: February 5, 2000 **Amount requested:** $299,997
Topic: The research investigates mechanisms of metabolic depression in hibernation as a model for understanding how to suppress metabolic demands in humans. The utility includes physiological health in long voyages and flights, development of better emergency medical protocols, and mechanisms for maintaining injured people as they are moved to proper medical facilities.

Title: Molecular Mechanisms of Metabolic Suppression: Protein Synthesis and Mitochondrial Respiration in a Hibernating Ground Squirrel Model.
Principal Investigator: Bert B. Boyer, Associate Professor of Molecular Biology, UA Fairbanks
Date of award: February 5, 2001 **Amount requested:** $299,998
Topic: The research determines the involvement of, and mechanisms governing ATP utilization and proton leak associated with metabolic suppression during entrance into torpor. It bears on prolonged human survival during earthquakes, submersion in cold water, and hypothermia induced during surgery.

Title: Order Reduction of Large Scale Systems via Nonlinear Normal Modes.
Principal Investigator: Eric Butcher, Asst. Professor of Mechanical Engineering, UA Fairbanks
Date of award: February 5, 2001 **Amount requested:** $475,911
Topic: The research addresses development of models for systems with non-linear properties such as multibladed rotor systems and trusses with bolted joints. Existing order reduction techniques are used as a starting point to develop methods for order reduction which are applicable to both state-space and structural models. Results obtained on the basis of linear order reduction techniques will also be provided for comparison. The proposed methods are expected to provide superior results.

Title: Synthesis of a New Generation of Bio-composite Materials.
Principal Investigator: Hong Liang, Asst. Professor of Mechancial Engineering, UA Fairbanks
Date of award: Not awarded
Topic: The research utilizes both modeling and laboratory experiments for the development of new bio-composite materials. Human bones are simulated to develop a strong and load-bearing porous material as a substrate able to host grown tissue within the pores. Potential applications include replacement of human joints and lubrication and durability in non-living systems.

LIST OF PUBICATIONS AND TECHNICAL REPORTS: None

PARTICIPATING SCIENTIFIC PERSONNEL.

Project Administration:
Dr. George Happ, PI
Project Director for Alaska EPSCoR
Research Professor, Institute of Arctic Biology, University of Alaska Fairbanks.

Participants in project supported activities: Please refer to the attached lists of workshop participants.

REPORT OF INVENTIONS: None

Workshop: Materials Research and Manufacturing for Alaska

Sponsors:

Alaska EPSCoR Program
Alaska Science and Technology Foundation
Department of Energy
National Science Foundation

Date: February 9, 2001 (8:30 AM to 5:00PM)

Location: Runcorn Conference Room, Rm 300, Natural Science Facility, UAF

Agenda:

8:30 – 8:45AM	**Opening Remarks** George Happ, Alaska EPSCoR Mark Bendersky, ASTF Dave Woodall, UAF
8:45 –9:15 AM	**NSF _Supported Activities in Materials Research and Education** Lance Haworth, NSF
9:15 – 10:00AM	**Alaska Business:** Billy Connor State of Alaska – DOT & PF Jim Norman Alaska Battery Systems
10:00 – 10:15 AM	**Break**
10:15 – 10:40 AM	**Arctic Research and Facilities at UAF** Ted DeLaca, UAF
10:40 – 11:00 AM	**UAF Energy Center and Materials** Ron Johnson, UAF
11:00 – 11:30 AM	**Materials Research at the Argonne National Laboratory** Jackie Johnson Materials Science Division, Argonne National Laboratory (ANL)
11:30 – 12:00 PM	**Solid Lubrication** George Fenske Argonne National Laboratory (ANL)
12:00 – 1:00 PM	**Lunch**

1:00 – 1:30 PM	**Arctic Materials** A. Okhlopkova, Institute of Nonmetallic Materials Yakutsk, Russia
1:30 – 2:00 PM	**Bioengineering** Kevin E. Healy University of California Berkley
2:00 – 2:30 PM	**Thin Film Growth and Characterization** Saibal Mitra University of Tulsa
2:30 – 2:45 PM	**Break**
2:45 – 3:00 PM	**Freezing Calculations** Roger Poeppel Argonne National Lab (ANL)
3:00 – 3:30 PM	**Rapid Freeze Prototyping** Ming Leu University of Missouri-Rolla
3:30 – 4:10 PM	**Automotive Perspectives on Future Trends Related to Tribological Materials and Manufacturing Technology** Simon Tung General Motors
4:10 – 4:40 PM	**Status and needs in the Microelectronics Industry** Kristan Bahten Rippey Corporation
4:40 – 5:30 PM	**Discussions, Jonah Lee (lead), Eric Butcher, & Chuen-Sen Lin** Gaps between UAF and the rest in materials research and manufacturing (including personnel and equipment) Suggested focused areas Development plan: New Hire – Fall 2001 Workshop in focused area – Fall 2001 Collaboration, etc.

Participants for Alaska Materials Workshop
February 9, 2001

ABS Alaskan, Inc.
Jim Norman

Alaska DOT& PF
Billy Connor
Stephan Saboundjian

Alaska EPSCoR
George Happ
Nora Kelly
Bambi Bellflowers

Alaska Miner's Association
Steve Borell

Alaska Science & Technology Foundation
Mark Bendersky

Argonne National Laboratory
George Fenske
Jackie Johnson
Ron Poeppel

General Motors R&D
Simon Tung

Institute of Nonmetallic Materials
Aitalina Okhlopkova

National Science Foundation
Lance Haworth

Rippey Corporation
Kristan Bahten

University of Alaska Fairbanks – Chemistry
Tom Green

University of Alaska Fairbanks – Civil Engineering
John Ma

University of Alaska Fairbanks – CSEM
Dave Woodall

University of Alaska Fairbanks – Geology/Geophysics
Kim DeRuyter

University of Alaska Fairbanks – Mech. Engineering
Eric Butcher
Doug Goering
Tang Guoyi
Ron Johnson
Hong Liang
Chuen-Sen Lin
Rorik Peterson

Cont. UAF Mech. Engineering
Jack Schmid
Dennis Witmer
Helen Xu
Jonah Lee

UAF Office of Sponsored Programs
Ted DeLaca

UAF Physics
Ataur Chowdhury

University of California Berkley
Kevin Healy

University of Missouri-Rolla
Ming Leu

University of Tulsa Physics Department
Saibal Mitra

Ushers, Inc.
Michael Sheppard

Home
Content
Workshop
Agenda
Registration
Program
Location
Committee
Contact
Links
Photos

Executive Summary
Workshop Brochure

University of Alaska Anchorage

Cold Regions Port & Coastal Infrastructure Workshop Program

A Workshop on 4 - 5 January 2001

Program

Day 1 (Thursday, 4 January 2001)

Welcome and Keynote Speaker: UAA Chancellor Lee Gorsuch

Sea-Ice:

- (Walter) Terry Tucker (Cold Regions Research and Engineering Laboratory (CRREL))
- Walter Parker (US Arctic Research Commission)
- Nate Mulherin (Cold Regions Research and Engineering Laboratory (CRREL))
- Mark Hopkins (Cold Regions Research and Engineering Laboratory (CRREL))
- Bill Lee, Orson Smith (University of Alaska Anchorage)

Luncheon 1 Speaker: *UNIVERSITY OF ALASKA PRESIDENT MARK HAMILTON*

Coastal:

- Owen Mason (University of Alaska, statewide)
- Hajo Eiken (University of Alaska Fairbanks)
- Yuri Shur (Permafrost Science Co., Anchorage)

Offshore & Coastal Surveying & Mapping:

- Bob Pawlowski (Racal Pelagos)
- LT Doug Baird (NOAA)
- Jennifer Irish (Waterways Experiment Station)
- John Oswald (LCMF)

Workshop Discussions

- Cold regions port design and construction:
  - Multi-purpose terminals
  - Harbors
  - Port authorities in Alaska
  - DeLong Mountain terminal
  - Port McKenzie
- Charting and mapping of:
  - Shorelines
  - Habitats
  - Geotechnical characteristics
- Coastal shore protection:
  - Monitoring shoreline retreat
  - Effective erosion control
- Data and technology transfer:
  - Cook Inlet Ice Atlas
  - Alaska Sea Ice Atlas
  - Engineering Atlas of Alaska
- Research and development:
  - Port engineering
  - Coastal engineering
  - Hydrographic surveying

Workshop Agenda

Thursday, January 4, 2001

8:30 am	Registration (Business Education Building – BEB Lobby) Coffee and pastries
9:00 am	Welcome and Keynote Speaker, BEB 101 *UA President Mark Hamilton*
9:30 am	Sea Ice Session
10:30 am	Break (BEB Lobby)
10:45 am	Sea Ice Session (Continued)
12:00 pm	Luncheon (Lucy Cuddy Center)
12:15 pm	Luncheon Presentation
1:30 pm	Coastal Session
2:30 pm	Break (BEB Lobby)
2:45 pm	Offshore and Coastal Surveying
4:00 pm	Adjournment

Friday, January 5, 2001

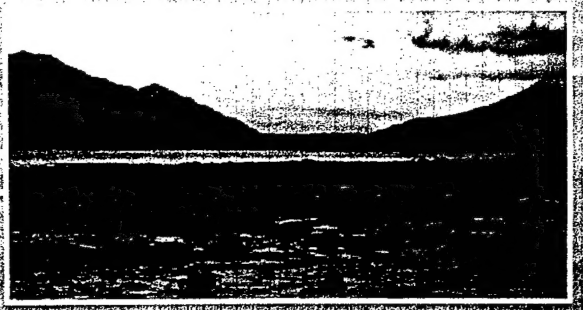
8:30 am	Registration (BEB Lobby) Coffee and pastries
9:00 am	Port and Coastal Engineering in Alaska Session I
10:30 am	Break (BEB Lobby)
10:45 am	Port and Coastal Engineering in Alaska Session II
12:00 pm	Luncheon (Lucy Cuddy Center)
12:15 pm	Luncheon Presentation
1:30 pm	Plenary Discussions
3:00 pm	Break (BEB Lobby)
3:15 pm	Closing Remarks
4:00 pm	Adjournment

Workshop agenda is current as of this publication. Changes may occur due to extenuating circumstances.

Registration

For additional information and to register online, please visit the workshop website:

www.engr.uaa.alaska.edu/PortCoastal/



Cold Regions Port & Coastal Infrastructure Workshop

Proposed Agenda

Day 1 - Thursday, January 4, 2001

8:30 AM REGISTRATION: (Business Education Building – BEB Lobby)

9:00 AM CALL TO ORDER: (BEB 101)
Orson Smith, University of Alaska Anchorage

9:10 AM WELCOME and OPENING REMARKS:
UAA Chancellor Lee Gorsuch

9:30 AM SEA ICE:
(Walter) Terry Tucker, Cold Regions Research and Engineering Laboratory (CRREL)
*Walter Parker, US Arctic Research Commission, "International Arctic Infrastructure Working Group, Arctic Council"
*(Walter) Terry Tucker, Cold Regions Research and Engineering Laboratory, "Shrinking and Thinning of Arctic Sea Ice"
*Nate Mulherin, Cold Regions Research and Engineering Laboratory, "Cook Inlet Ice Atlas"
*Mark Hopkins, Cold Regions Research & Engineering Laboratory, "Discrete-element Modeling of Sea Ice in Cook Inlet"
*Bill Lee, University of Alaska Anchorage, "Alaska Sea Ice Atlas"

10:30 AM BREAK (BEB Lobby)

10:45 AM SEA ICE (Continued)

12:00 PM LUNCHEON (Lucy Cuddy Center)

12:15 PM LUNCHEON PRESENTATION:
UNIVERSITY OF ALASKA PRESIDENT MARK HAMILTON

1:30 PM ALASKA'S COAST:
Orson Smith, University of Alaska Anchorage
*Owen Mason, University of Alaska Anchorage, "Living with the Coast of Alaska"
*Hajo Eiken, University of Alaska Fairbanks, "Remote Sensing of Arctic Coastal Processes"
*Yuri Shur, Permafrost Science Co., and Alexander Vasiliev, Earth Cryosphere Institute of Russian Academy of Sciences, "Monitoring Coastal Erosion in Russia"

2:30 PM BREAK (BEB Lobby)

2:45 PM OFFSHORE & COASTAL SURVEYING & MAPPING:
Bob Pawlowski, Racal Pelagos
*LT Doug Baird, NOAA, "Hydrographic Surveying Requirements"
*Jennifer Irish, Waterways Experiment Station, "Lidar Hydrographic Surveying"
*John Oswald, LCMF, "Tidal Datums and Zoning in Alaska"
*Bob Richards, Racal Pelagos, "Hydrographic Surveying in Alaska"

4:00 PM ADJOURNMENT

Day 2 - Friday, January 5, 2001

8:30 AM REGISTRATION (BEB Lobby)

9:00 AM PORT & COASTAL ENGINEERING IN ALASKA I:
Harold Moeser, Alaska Dept. of Transportation & Public Facilities (ADOT&PF)
*Eric Taylor, State of Alaska DOT&PF, and John Aho, CH2M HILL, "North & NW Alaska Transportation Study"
*Elaine Pflugh, Corps of Engineers, "Nome Harbor Improvements"
*Harold Moeser, ADOT&PF, "State Policies and Programs for Port and Coastal Infrastructure"
*Marc Van Dongen, Matanuska-Susitna Borough, "Port MacKensie"

10:30 AM Break (BEB lobby)

10:45 AM PORT & COASTAL ENGINEERING IN ALASKA II:
Leonard Johnson, University of Alaska Fairbanks
*Ted Trueblood, Tryck-Nyman-Hayes, "Port of Anchorage Intermodal Marine Facility"
*Jim Barnett, Attorney, "Whittier Port and Harbor Developments"
*Dennis Nottingham, PN&D, "Alaska Port and Coastal Projects"
*Jeff Thompson, Alaska Maritime Agencies, "Marine Exchange of Alaska"

12:00 PM Luncheon (Lucy Cuddy Center)

12:15 PM LUNCHEON PRESENTATION
Steve Hunt, AGRA Simons Ltd., "DeLong Mountain Port Expansion"

1:30 PM PLENARY DISCUSSIONS:
*Orson Smith, University of Alaska Anchorage
*Bob Pawlowski, Racal Pelagos
*Leonard Johnson, University of Alaska Fairbanks
*(Walter) Terry Tucker, Cold Regions Research and Engineering Laboratory (CRREL)

3:00 PM BREAK (BEB Lobby)

3:15 PM CLOSING REMARKS

4:00 PM ADJOURNMENT

Participants for Cold Regions Engineering Research Needs
December 7, 2000

Mark Bendersky

Billy Connor, Statewide Research Manager
AK DOT & PF

Doug Goering, Professor
Mechanical Engineering
University of Alaska Fairbanks

John Hargesheimer, President,
Nortech Environmental & Engineering Consultants

Jerry Johnson (for David Williams), USA CRREL
Ft. Wainwright, AK

John McClellan, President/CEO
ASCG Incorporated

John Olofsson

Lyle Perrigo, Anchorage Staff Officer
US Arctic Research Commission

Bob Scher, R7M Consultants, Inc.

Per Wangstrom, BP Exploration (Alaska), Inc.

Steve Weaver, Director
Department of Health and Environmental Engineering
Alaska Native Tribal Health Consortium

Jack Wilbur, President
Design Alaska